# Next Generation Internet (NGI)

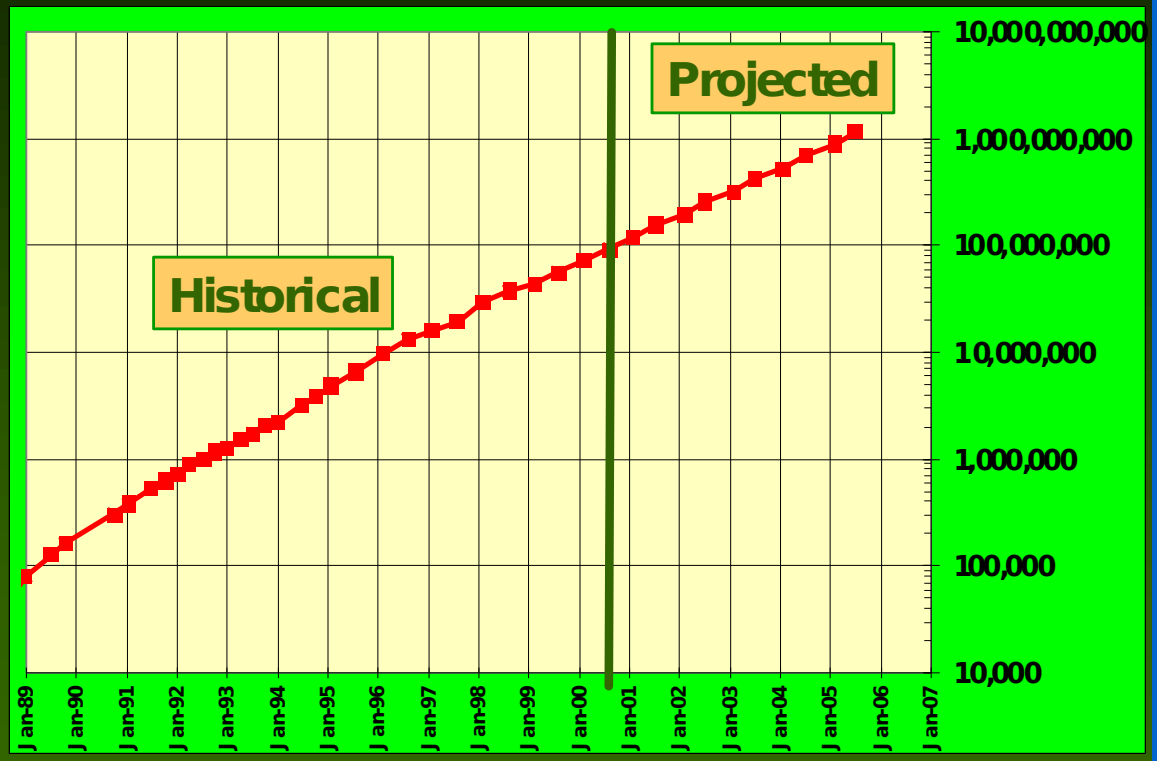
Internet of the Future

# Next Generation Internet (NGI)

- Exponential Internet Host Site Growth and New Network Application Requirements have created a Need for Advanced Ultra-High Speed Internet Networks

# Next Generation Internet (NGI)

## Internet Hosts - Overall Trend

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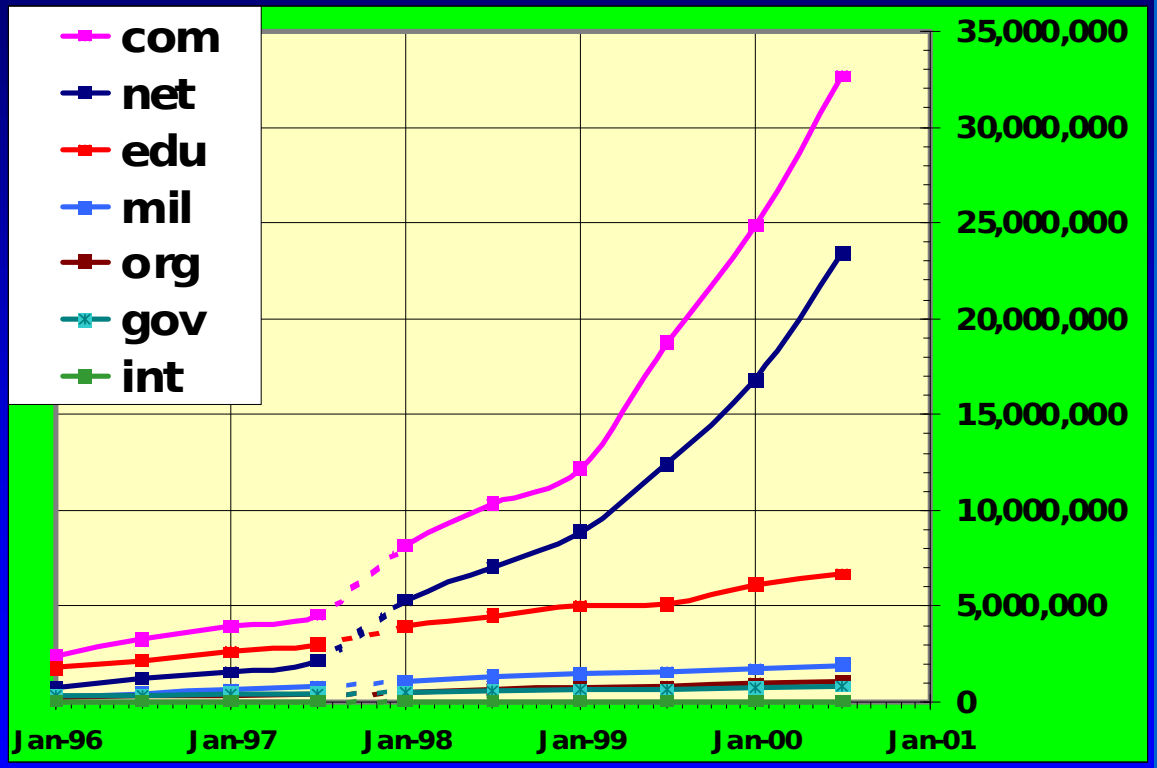
## Hosts: Three-Letter Domains

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# Next Generation Internet (NGI)

- The Next Generation Internet (NGI) will be the pathway to terabit-per-second network speeds over wide area advanced capability networks.

# Next Generation Internet (NGI)

- The networks developed under the NGI initiative connect multiple sites -- universities, Federal research institutions, and other research partners -- at speeds 100 times faster end-to-end than those of today's Internet, and will connect future sites at speeds 1,000 times faster end-to-end than the current Internet.

- End-to-end connectivity (such as between two workstations) will be at speeds from over 100 million bits per second (Mbps) to over 1 billion bits per second (Gigabits per second or Gbps).

# Next Generation Internet (NGI)

- Networks backbone links have achieved OC-12 (Optical Carrier) speeds (622 Mbps)
- Experimental links are running at over 1 Gbps,
- End-to-end usable connectivity is typically limited to less than 10 Mbps because of bottlenecks or incompatibilities in switches, routers, local area networks, and workstations.
- NGI goals address these shortcomings through development testbed networks of advanced high speed networks

# Next Generation Internet (NGI)

- The development of ultrahigh speed switching and transmission technologies and of end-to-end network connectivity transmission at over 1Gbps will lay the groundwork for terabit per second (trillions of bits per second, Tbps)

# Next Generation Internet (NGI)

- NGI networks will be operated by appropriate network management and control systems that guarantee end-to-end quality of service.

# Next Generation Internet (NGI)

- Federal agencies have identified appropriate applications to be developed and tested on the NGI networks.
- Federal agencies will adapt their applications to take advantage of NGI capabilities.
- The resulting applications will integrate advanced NGI networking and application technologies

# Next Generation Internet (NGI)

- NGI applications will be an iterative process with Federal, academic, and industry participation.
- Federally focused application technologies such as digital libraries, remote operation of medical instruments, environmental monitoring, crisis management, manufacturing, basic sciences, and Federal Information Services.

# Next Generation Internet (NGI)

## Achievements/Goals

- 1999 - Over 100 sites providing OC-3 (155 Mbps) connections over OC-12 (644 Mbps)
- 2000 - Over 10 sites providing ultrahigh performance OC-48 connections (2.5 Gbps)
- 2000 100+ high value applications being tested over the high performance testbed
  (for example, remote, real time, collaborative NGI network control of select laboratories)
- 2001 - Networking/applications research conducted on the1000x testbed
- 2002 - Terabit-per-second packet switching
- 2002 Advanced applications being tested over the ultrahigh performance testbed

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